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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/709,728	05/25/2004	Hsiao-An Hsieh	81096756 / FMC 1671 PUS	3727

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BROOKS KUSHMAN P.C./FGTL
1000 TOWN CENTER
22ND FLOOR
SOUTHFIELD, MI 48075-1238

EXAMINER

BANKHEAD, GENE LOUIS

ART UNIT	PAPER NUMBER
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3744

DATE MAILED: 12/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/709,728	HSIEH ET AL.	
	Examiner	Art Unit	
	Gene L. Bankhead	3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 14-20 is/are rejected.
- 7) ☒ Claim(s) 13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 May 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 U.S.C. § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5, 7, 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bathla(US 5987903).

With regard to claims 1-3,7, and 8 Bathla (US 5987903) teaches a system capable of assessing a refrigerant charge level in a vehicle air conditioning system (Abstract lines 1-2). Bathla further teaches the system comprises a first sensor 16 for providing a cooled air temperature signal, second and third sensors (column 4 lines 10-15) for providing an ambient air temperature and ambient humidity level, and a fourth sensor (column 3 lines 6-8), for providing a compressor cycling signal. Though Bathla does not explicitly teach a sensor for calculating compressor rpm, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a sensor as the subcooling value is a function of the compressor rpm. Further Bathla teaches a processing module 20 capable of determining a refrigerant charge level as a function of signals from the first through the fourth sensors and an indicator capable of indicating that the level of refrigerant charge is acceptable 54 if the charge level is greater than a threshold value (column 4 lines 1-17) or indicating that the level of refrigerant charge is

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unacceptable 56 (column 4 lines 18-28). Bathla teaches the temperature and pressure sensors 16 and 18 are disposed on the conduit 7 of the vehicle, see Figure 1.

With regard to claim 4, though Bathla does not explicitly teach the compressor clutch signal is a voltage sensor, voltage sensors in vehicle refrigeration systems are well known in the art, see (US 6293114). Further the simple addition of a voltage sensor to an existing prior art reference is not sufficient to patentably distinguish the claimed invention from a prior art reference.

Regarding claim 5, Bathla teaches all limitations of claim 1, however fails to teach the vehicle sensors are not disposed on the vehicle. It would have been an obvious matter of engineering design choice to not dispose the vehicle sensors on the vehicle as mere location of the vehicle sensors does not change the scope of the invention. For wherever the sensors are located they serve the same purpose of detecting and reading the temperature at said locations.

Claims 6, 9, 10-12, 14-16, and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bathla in view of Scoccia (US 5481884).

In regard to claims 6, 9, 10, 11, 15, 16, and 17-19 Bathla in view of Scoccia (US 5481884) teaches a system capable of performing the methods of claim 10, 11, 15 and 16. Bathla (US 5987903) teaches a system capable of assessing a refrigerant charge level in a vehicle air conditioning system (Abstract lines 1-2). Bathla further teaches the system comprises a first sensor 16 for providing a cooled air temperature signal, second and third sensors (column 4 lines 10-15), for providing an ambient air temperature and ambient humidity level and a fourth sensor (column 3 lines 6-8), for providing a

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compressor cycling signal though Bathla does not explicitly teach a sensor for calculating compressor rpm it would have been obvious to one of ordinary skill in the art at the time of the invention to provide that a sensor is present as the subcooling value is a function of the compressor rpm. Further Bathla teaches a processing module 20 capable of determining a refrigerant charge level as a function of signals from the first through the fourth sensors and an indicator capable of indicating that the level of refrigerant charge is acceptable 54 if the charge level is greater than a threshold value (column 4 lines 1-17) or indicating that the level of refrigerant charge is unacceptable 56 (column 4 lines 18-28). Bathla further teaches a compressor 6 adapted to circulate a refrigerant and an air-handling subsystem for providing air cooled by the refrigerant subsystem to a vehicle passenger compartment (column 1 lines 14-27). Bathla fails to explicitly teach the fourth signal indicates the cycling of the compressor between the engaged and disengaged states. Scoccia teaches a refrigerant charge detection system wherein a controller 50 controls a compressor by either engaging or disengaging a compressor clutch (column 1 lines 15-24). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a sensor indicative of cycling of the compressor between an engaged and disengaged state to advantageously disengage the compressor cycling clutch when there is a low refrigerant charge and thus prevent compressor damage in view of the teachings of Scoccia (column 5 lines 15-20).

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With regard to claims 12 and 20, Bathla in view of Scoccia teach all limitations of claim 10, however do not teach the first and fourth signals are sampled more frequently than the second and third signals. However it would have been obvious to one of ordinary skill in the art at the time the invention was made to sample the cooled air temperatures and compressor cycling signals more frequently, as it is well known that these values change more frequently than the ambient air temperature and humidity change when the vehicle is in operation because the compressor cycling and cooled air sensors are directly affected by internal vehicle conditions, and humidity and ambient temperature factors are directly affected by conditions external to the vehicle which don't change as often. Thus more samples would be needed for a more accurate assessment of their measurements.

With regard to claim 14, Bathla in view of Scoccia teach all limitations of claim 10. It would have been obvious to one of ordinary skill in the art at the time the invention was made to position the temperature signal as close as possible to a vent aperture in the air handling subsystem to advantageously ensure no, or minimal, temperature drop in the air after leaving the air handling subsystem before being detected by the temperature sensor.

ALLOWABLE SUBJECT MATTER

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Claim 13 is rejected as being dependent on a rejected base claim but would be allowable if rewritten in independent form to include all limitations of claim 10.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gene L. Bankhead whose telephone number is (571)-272-8963. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on (571)-272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


CHERYL TYLER
SUPERVISORY PATENT EXAMINER

GB
Examiner
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